

ABSTRACT

The present invention features geothermal systems with improved control strategies for efficient operation of multiple geothermal wells. In many embodiments, each well in a geothermal system of the present invention is operated in cycles. Each cycle includes a heat exchange phase followed by a thermal recovery phase. During a heat exchange phase, the well is engaged in exchanging heat with a heat pump. During a thermal recovery phase, the well is kept inactive for establishing thermal equilibrium with the earth. On many occasions, the geothermal system simultaneously operates a group of wells in a heat exchange phase to serve the building HVAC load, while maintaining other wells inactive for thermal recovery. The switching between different operational stages is regulated for each well to improve the overall performance of the system while satisfying the building demand.